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Report of Findings from a Field Investigation of Timber Sale Units in the Boaz Mortality Salvage Sale, Ashland Field Office of the Bureau of Land Management

I was commissioned by the Applegate Siskiyou Alliance to do a field evaluation of timber sale units in the Boaz Mortality Salvage Sale. On November 13, 2024, I reviewed the "Categorical Exclusion Review" (NEPA # DOI-BLM-OR-ORWA-M060-2024-0004-CX) and the "Prospectus" (Medford Sale # ORM06-TS-2024.0009 dated 9/26/2024) drafted by the Ashland Field Office of the BLM. I also reviewed the following information:

Bennett, Max et. al., "Recent Douglas-fir Mortality in the Klamath Mountains Ecoregion of Oregon: Evidence for a Decline Spiral", *Journal of Forestry*, 2003,

Bennett, Max et. al., "Trees on the Edge", OSU Extension Service, 9/23

Buhl, Christine et. al., "Forest Health Highlights in Oregon-2022", ODF, OSU, USFS, 2022

CalTopo, USDA Farm Service Agency, 2013-2015 NAIP aerial imagery

Furniss, R.L. et. al., "Western Forest Insects", in "Advanced Insect and Disease Field Session, Identification, Life Cycles, Control Measures, and Silvicultural Regimes", Western Forestry and Conservation Association, June 27-30, 2011

Google Earth, 10/27/2023 aerial imagery

Oregon Department of Forestry, "Flatheaded Fir Borer", Forest Health Fact Sheet, 12/2016

Schaupp, Bill, "Flatheaded Fir Borer in Southwestern Oregon Douglas-fir: Is the Insect Responsible for all Die-off?"", Forest Health in Oregon – State of the State 2018

Six, Diana L. et. al., "Management for Mountain Pine Beetle Outbreak Suppression: Does Relevant Science Support Current Policy?", *Forests*, 2014

Six, Diana L. et. al., "Are Survivors Different? Genetic-Based Selection of Trees by Mountain Pine Beetle During a Climate Change-Driven Outbreak in a High-Elevation Pine Forest", *Frontiers in Plant Science*, 7/23/2018

USDA_NRCS, "Soil Survey of Jackson County Area, Oregon", 1993

This sale was presented in the Categorical Exclusion as a salvage sale, defined in Section A. as "Salvage harvesting is the removal of dead trees or of trees damaged or dying because of injurious agents other than competition to recover their economic value (2016 SWO ROD/RMP, p. 312) (emphasis added). A dying tree is defined in Section C. as "For this Categorical Exclusion (CX), a dying tree is defined as a standing tree that has been severely damaged by forces such as fire, wind, ice, insects, or disease, and that in the judgment of an experienced forest professional or someone

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technically trained for the work, the tree is likely to die within a few years." (emphasis added).

In Section B, page 2 of the CX it is stated that "Stands were proposed for treatment based on observed signs of tree decline in combination with environmental conditions that increase the risk of FFB [flatheaded fir borer] mortality: low elevation, aspect, topographic position, climate, and observed signs of tree decline. Experienced forest professionals would designate trees for cutting/salvage harvesting based on a combination of factors but utilizing a tree risk assessment developed based on local research (OSU Extension Service 2023)." Table 2: Signs of Tree Decline (below) was evidently used in the field to determine whether trees were "severely damaged" and "likely to die within a few years" and thus whether they should be marked for retention. I have added a column to this table to show the observed presence of the "selection criteria" in the sale units.

Selection Criteria	Determination of Dead or Dying	Observed Presence of Selection Criteria
Degree of crown fading	Presence of red needles & dead/dying branches within tree crown	Crown fading rare; few trees with red needles or dead/dying branches within tree crowns
Pitch jewels	Presence of small clear pitch droplets	Rare in the lower sections of boles where visible from the ground
Percentage of live crown	<30% live crown	Common to see <30% LCRs, due to competition (i.e. tree density)
Quantity of stress crop	Overabundance of cones	Stress cones rare
FFB pitch tubes	Presence of pitch tubes & missing or deteriorating bark	Moderately rare pitch streamers; no pitch tubes visible from ground
Proximity to dead trees	Presence of dead DF	Mostly scattered snags within stand interiors; a few small pockets in some units but snags mostly along unit boundaries; Unit 27-6 has many snags
Proximity to OR WO stands	Nearby OR WO stands indicate that DF is near its lower threshold of water availability	Most units have WO stands along portions of some boundaries
Quality of foliage	Fading green crowns	Mostly green and healthy crowns but thinning on some trees, mostly along unit boundaries

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The Prospectus (OTHER 1.) states that "All units are retention marked for salvage harvest. All unmarked Douglas-fir trees meeting minimum merchantability specifications have been deemed dead or dying and need to be cut and removed regardless of individual tree value." (emphasis added).

On November 14 and 15 I visited all thirteen units in the Boaz Mortality Salvage Sale in the company of Luke Ruediger from the Applegate Siskiyou Alliance, with the express purpose of verifying that trees had been correctly marked in accordance with the CX and the Prospectus. We walked into and through all the units except for units 26-1, 34-2, and 35-4, which we viewed from road(s). Detailed descriptions of each unit are included in Appendix A.

We found that most of the live trees, specifically Douglas-firs which were not marked for retention and thus slated for salvage logging, did not meet the CX definition of "severely damaged" and "likely to die within a few years". Relatively few trees, found in most of the units, did meet the CX definition, generally due to attack by either bark beetles or borers (species unverified).

The CX criteria for signs of tree decline (Table 2), while likely valid taken as a whole, did not define most of the live trees in the sale units. In particular, the criterium for dying trees having <30% crowns might be valid for dying trees displaying fading crowns with red needles and dead or dying branches within their crowns but not for most of the trees, which have crowns that are a healthy green with dead branches mostly below their live crowns. It should be noted that in the Max Bennett study (page 6) a DF was considered to be dying ". . if it had more than 50% recent foliage loss or branch dieback or signs and symptoms of FB or bark beetle attack (e.g., woodpecker "shaved" bark)." (emphasis added).

In dense stands it is common for competition for light to result in branch pruning (die off) of branches in the lower portions of tree crowns, resulting in live crown ratios of <30%. In previous timber sales in the Weaverville Community Forest in Trinity County, California many of the dominant and codominant leave trees had crowns ranging from 20-30%. Rather than dying following logging, these trees have continued to grow and increase the length of their crowns through increased height growth.

As discussed in the Max Bennett study (page 13), "There is a large body of research showing that high stand densities are associated with reduced tree vigor and subsequent increases in tree mortality (e.g., Bradford and Bell 2017; Furniss et al. 2022; Gleason et al. 2017). However, we did not see a clear relationship between stand density and either the likelihood or intensity of DF mortality in our plot data. This may suggest the DF decline and mortality in the biophysical settings considered in this study [Oregon portion of the Klamath ecoregion and a part of the western Cascades

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ecoregion (figure 3) which, with the exception of a small area in the southern coast range, comprises the entire area in Oregon where the FB has been detected by the Aerial Detection Survey] is not strongly influenced by inter-tree competition, or that any competitive effects were masked by variation in site productivity and carrying capacity."

Regarding the CX criteria for signs of tree decline (Table 2), the Max Bennett study developed a risk score for DF mortality based on findings from 96 plots. As discussed in that study (page 13), "At the stand scale, our risk score can be used to predict the likelihood and intensity of mortality based on topographic and site factors in locations similar to our study sites where there has already been significant but variable mortality. However, there is considerable variability in mortality levels within and across sites that is not explained or predicted by the environmental variables that make up the risk score. For example, some DF mortality is seen on north slopes, in riparian zones, and in the interiors of stands. We expect these trends to continue as hotter droughts continue and intensify. Specifically, future mortality is likely on the most climatically marginal sites for DF, regardless of topo-edaphic variation, and sites may need to be recategorized for risk and hazard as climates shift."

However, "Although DF mortality is likely to increase, we caution against concluding that all DF trees in high-risk locations will die in the near future and should be "written off." The DF patches occupying steep northeast aspects, for example, are somewhat buffered from moisture stress and may serve as refugia." It should be noted that 11 of the 13 units in the Boaz sale are steep and only 4 of the 13 units have any portions with west, southwest, or southeast aspects, generally considered hotter and drier, while 11 of the 13 have all or significant portions of the units with northwest to east aspects, considered more favorable environments.

In summary, from my field survey of the thirteen units in the Boaz Mortality Salvage Sale, I conclude that most of the live Douglas-firs are not "severely damaged" nor "likely to die within a few years" and therefore do not meet the CX definition of dying trees. These trees are incorrectly designated for cutting in the units. I also conclude that while the selection criteria for signs of tree decline in Table 2 are valid taken together, they may not apply when taken individually. This is particularly true for tree crowns <30%, which in these sale units is a function of tree competition for light, not a sign of tree decline. My judgement in this regard is based on 52 years of professional forestry experience, including decades of forest inventory and timber marking experience (see Appendix B).

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November 21, 2024